MEETING MATERIALS

Elucidating Environmental Dimensions of Neurological Disorders and Diseases: Understanding New Tools from Federal Chemical Testing Programs

UC Davis Conference Center
Davis, CA
June 18-19, 2015

A meeting organized by Environmental Defense Fund (EDF)

EDF ENVIRONMENTAL DEFENSE FUND
Finding the ways that work

In partnership with

EPA United States Environmental Protection Agency

NTP National Toxicology Program

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Agenda

Elucidating Environmental Dimensions of Neurological Disorders and Diseases: Understanding New Tools from Federal Chemical Testing Programs

UC Davis Conference Center
Davis, CA
June 18-19, 2015

DAY 1 – Thursday, June 18th

8:00 – 9:00 **Continental Breakfast (provided)**

9:00 – 9:10 **Opening Remarks from Environmental Defense Fund & UC Davis MIND Institute**

- Sarah Vogel – *Environmental Defense Fund (EDF)*
- Jennifer McPartland – *EDF*
- Leonard Abbeduto – *UC Davis MIND Institute*

9:10 – 9:50 **Welcome and Introduction from Federal Government**

Moderator: Gina Solomon – California Environmental Protection Agency (CalEPA)

- Thomas Burke – *Environmental Protection Agency (EPA)*
- Linda Birnbaum – *National Institute of Environmental Health Sciences/National Toxicology Program (NIEHS/NTP)*

9:50 – 12:00 **Session I: Introduction to New Federal Chemical Testing Programs – Part I**

Moderator: Tina Bahadori – *EPA*

- Russell Thomas – *EPA*
- Keith Houck – *EPA*
- Matt Martin – *EPA*

12:00 – 1:30 **LUNCH (provided)**

Genius Bar sessions (one-on-one training sessions for attendees with EPA and NTP staff) will begin at lunch and run concurrently with the afternoon sessions and reception.

1:30 – 2:45 **Session II: Introduction to New Federal Chemical Testing Programs – Part II**

Moderator: Sarah Vogel – *EDF*

- Ray Tice – *NIEHS (Retired)*
- John Bucher – *NIEHS/NTP*

2:45 – 3:05 **BREAK**

3:05 – 5:25 **Session III: Integrating New Tools in Environmental Health Research**

Moderator: Elaine Faustman – *University of Washington*

- Kristina Thayer – *NIEHS/NTP*
- Francisco Quintana – *Harvard University*
- Robert Tanguay – *Oregon State University*
- Chirag Patel – *Harvard University*

5:25 – 7:00 **RECEPTION and Genius Bar Sessions**

DAY 2 – Friday, June 19th

Genius Bar Sessions - Ongoing throughout Day 2.

7:45 - 8:30 **Continental Breakfast (provided)**

8:30 – 8:35 **Welcome Back**

8:35 – 10:20 **Session IV: Applying Federal HTS Data in Neuro Research**
Moderator: Kristina Thayer – *NIEHS/NTP*
- Seth Kullman – *North Carolina State University*
- Heather Patisaul – *North Carolina State University*
- Scott Auerbach – *NIEHS/NTP*

10:20 – 10:40 **BREAK**

10:40 – 1:00 **Session V: Neurodevelopmental Disorders and Disease & Opportunities for New Chemical Testing Data**
Moderator: Robert Ring – *Autism Speaks*
- Elaine Faustman – *University of Washington*
- Pamela Lein – *University of California, Davis*
- Valerie Hu – *George Washington University*
- Craig Newschaffer – *Drexel University*

1:00 – 2:30 **LUNCH (provided)**

2:30 – 3:40 **Session VI: Neurodegenerative Disorders and Disease & Opportunities for New Chemical Testing Data**
Moderator: Peter Schmidt – *National Parkinson Foundation*
- Jeffrey Bronstein – *University of California, Los Angeles*
- Caroline Tanner – *University of California, San Francisco; San Francisco Veteran's Affairs Medical Center/Parkinson's Disease Research, Education and Clinical Center*

3:40 – 4:40 **Session VII: Future Opportunities in Research**
Moderator: Christopher Portier – *EDF*
Presentations from select groups on future research opportunities using new federal chemical testing data.

4:40 – 5:00 **Reflections on Meeting and Closing Remarks**
- Irva Hertz-Picciotto – *University of California, Davis*
- Sarah Vogel – *EDF*

Meals

Be sure to join us for:

Continental Breakfast

Thursday 8:00 AM to 9:00 AM

Friday 7:45 AM to 8:30 AM

Assorted muffins, bagels & cream cheese, fresh fruit, yogurt & granola, coffee & tea

Location: Main Ballroom, UC Davis Conference Center

Buffett Lunch

Thursday 12:00 to 1:30 PM

Tuscan Market Hot Buffet

Friday 1:00 PM to 2:30 PM

Deli Sandwiches and Salad Buffet

Location: Main Ballroom, UC Davis Conference Center

Reception

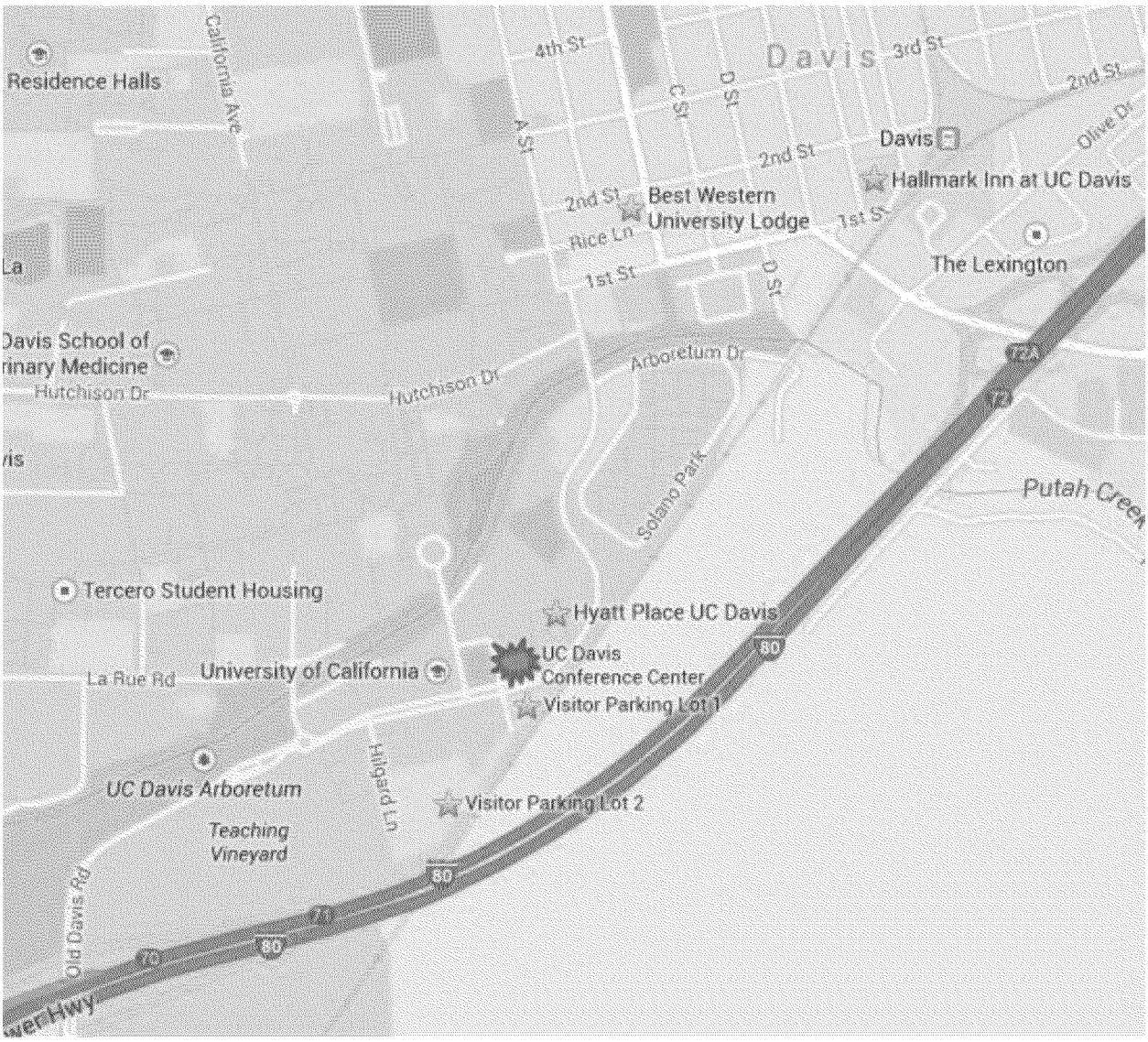
Thursday 5:30 PM to 7:00 PM

Wine, beer, refreshing sangria, and other beverages along with an international array of hot and cold hors d'oeuvres

Location: Lobby, UC Davis Conference Center

Meeting Map

Map of UC Davis Conference Center, Visitor Parking, and Hotels



Genius Bar Sessions

Genius Bar Sessions

What: One-on-one mini-training sessions that provide hands-on, guided exploration of new tools developed to mine emerging federal chemical testing data (i.e., ToxCast and Tox21 high-throughput screening data). The federal ToxCast and Tox21 programs will be reviewed in detail on the first day of the meeting.

ToxCast background information: http://www.epa.gov/ncct/toxcast/
Tox21 background information: http://www.ncats.nih.gov/tox21

Who: Meeting attendees and staff scientists from the Environmental Protection Agency (EPA) and the National Toxicology Program (NTP).

Where: Genius Bar sessions will be held at the UC Davis Conference Center in a clearly marked room adjacent to the meeting ballroom.

When: Genius Bar sessions will begin at lunch on the first day of the meeting and run continuously through the reception (Thursday, 12:00 – 7:00 p.m.). On the second day of the meeting, Genius Bar sessions will begin at breakfast and run through the close of the meeting (Friday, 8:00 a.m. – 5:00 p.m.). Sessions will be available in 20 minute increments.

How: Attendees will be able to reserve their 20-minute genius bar session using a sign-up sheet available at the meeting check-in desk.

Tools to be Featured during the Genius Bar Sessions

EPA Tools

The iCSS ToxCast Dashboard is an interactive tool for distribution, visualization, and use of chemical screening data from the Toxicity Forecaster (ToxCast) project and the Toxicity Testing in the 21st century (Tox21) collaboration. The iCSS ToxCast Dashboard integrates data from various sources including:

- ToxCast and Tox21 - High-throughput chemical screening data
- ExpoCast - Chemical exposure data and prediction models
- DSSTox - High quality chemical structures and annotations
- PhysChemDB – Physical Chemical Properties Database
- CPCat- Chemicals listed by associated categories of chemical and product use

Link to iCSS dashboard: http://actor.epa.gov/dashboard/ (for the best possible experience use Firefox or Chrome browsers)

NIEHS/NTP Tools

PubChem

PubChem allows access to large-scale chemical screening data—including but not limited to Tox21 quantitative high-throughput screening (qHTS) data—along with informatics to identify chemical probes for the evaluation of gene function, cellular processes, and biochemical pathways. PubChem is organized as three linked databases within the NCBI's Entrez information retrieval system: PubChem Substance, PubChem Compound, and PubChem BioAssay.

Link to PubChem database: https://pubchem.ncbi.nlm.nih.gov/

Tox21 Data Visualization Suite

Tox21 Data Visualization tools are focused on providing quick and easy to use access, visualization and clustering of Tox21 qHTS data. Notable features include:

- Identification of active vs. inactive compounds in an assay or across multiple assays. (Suite Tool: Tox21 Actives)
- Visualization of concentration-response curves of one or more compounds of interest with the ability to superimpose multiple assay results per compound for easy comparison. (Suite Tool: Tox21 Curve Browser)
- Prioritization of compounds using compound structure and/or Tox21 qHTS activity clustering visualization. Plots and data can be downloaded.

  (Suite Tool: Tox21 Activity Profiler)
- Tox21 qHTS quality control (QC) information. (Suite Tool: NCATS - Tox21 Data Browser)

Links to these resources are not yet available, but will be before the meeting here: http://ntp.niehs.nih.gov/tbox/

Tox21 Data Integration Suite

Tox21 Data Integration tools are focused on providing quick correlations between Tox21 compounds and biological and compound feature enrichment based on groupings of Tox21 chemicals by structure or biological activity. Notable features include:

- Identification of compounds in the Tox21 library that are structurally similar or that produce similar patterns of activity across assays.

  (Suite Tool: Tox21 Correlation Browser)
- Simultaneous screening of sets of compounds for enriched toxicological characteristics across multiple biological databases (DrugMatrix, PubChem, Comparative Toxicogenomics Database, Leadscope, and others). (Suite Tool: Tox21 Enricher)

Links to these resources are not yet available, but will be before the meeting here: http://ntp.niehs.nih.gov/tbox/

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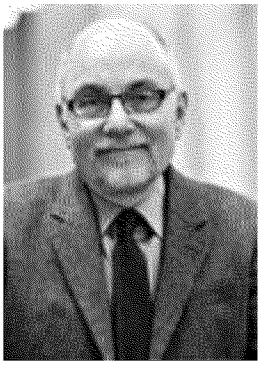
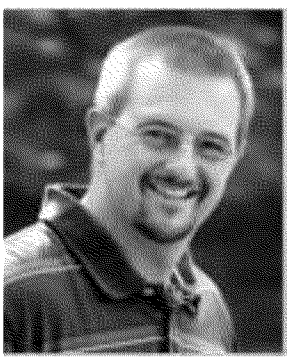


Len Abbeduto, Ph.D.

Director, UC Davis MIND Institute

Sacramento, California

Dr. Abbeduto is a leading expert on the behavioral growth of individuals with intellectual disabilities, particularly their development and use of language. His research focuses on the language and communication challenges faced by individuals with fragile X syndrome, the most common known cause of inherited intellectual disability and the leading single-gene cause of autism. Dr. Abbeduto also investigates the effects of stress on parents and caregivers who raise children with neurodevelopmental disorders and how their stress affects the behavior and development of their children. Dr. Abbeduto oversees more than 250 faculty, staff, postdoctoral fellows and graduate students focused on understanding, preventing and treating neurological disorders that arise during early childhood development, including autism, fragile X syndrome, attention-deficit/hyperactivity disorder (ADHD), Tourette syndrome and 22q11.2 deletion syndrome. At the institute, Dr. Abbeduto directs cutting-edge research, comprehensive educational programs to train the next generation of clinicians and scientists, innovative clinical services to diagnose and treat children, and extensive community engagement activities.



Scott Auerbach, Ph.D.

Molecular Toxicologist, Molecular Toxicology and Informatics Group, NTP/NIEHS

Research Triangle Park, North Carolina

Dr. Auerbach received a dual B.S. from The Pennsylvania State University in Physiology and Biochemistry/Molecular Biology in 1998. He then went on to receive his Ph.D. in Pharmacology from the University of Washington in 2004. From 2005 to 2007 Dr. Auerbach was a postdoctoral fellow at Duke University and then NIEHS under the direction Dr. David Schwartz where he undertook genetic studies of human pulmonary fibrosis. Subsequently he went on to a fellowship at the National Toxicology Program. Dr. Auerbach became a staff scientist at the National Toxicology Program in 2009 and became a Diplomate of the American Board of Toxicology the same year. He is currently the Toxicoinformatics Group Leader in the Biomolecular Screening Branch of the NTP. His research focuses on the application of molecular and high dimensional data to toxicological assessment with the goal of increasing efficiency in toxicology testing.

Tina Bahadori, Ph.D.

National Program Director, Chemical Safety for Sustainability, EPA

Washington, D.C.

Tina Bahadori is the National Program Director for Chemical Safety for Sustainability (CSS) at the U.S. Environmental Protection Agency. CSS research advances sustainable development, use and assessment of existing chemicals and emerging materials by developing and applying computational science, integrated chemical evaluation strategies, and decision-support tools. Before joining EPA in May 2012, she was the Managing Director of the Long-Range Research Initiative at the American Chemistry Council (ACC). Dr. Bahadori is a past president of the International Society of Exposure Science and was an associate editor of the Journal of Exposure Science and Environmental Epidemiology. She is currently a member of the National Academy of Sciences (NAS) Chemical Sciences Roundtable and an Agency Liaison to the Committee on Emerging Science for Environmental Health Decisions. In the past, she has served as a member of several NAS committees, including one on exposure science in the 21st Century. She has served as a member of the Board of Scientific Counselors for Centers for Disease Control and Prevention National Center for Environmental Health-Agency for Toxic Substances and Disease Registry. Dr. Bahadori holds a doctorate in environmental science and engineering from the Harvard School of Public Health.

Linda Birnbaum, Ph.D., D.A.B.T., A.T.S.

Director, NIEHS & NTP

Research Triangle Park, North Carolina

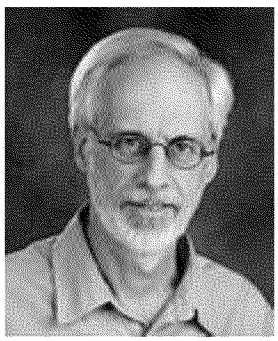
Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S., is the Director of the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH), and the National Toxicology Program. A board certified toxicologist, she has served as a federal scientist for over 35 years. Dr. Birnbaum is a former president of the Society of Toxicology, the largest professional organization of toxicologists in the world. She is the author of more than 700 peer-reviewed publications, book chapters, and reports, and is an adjunct professor at several universities. A native of New Jersey, Dr. Birnbaum received her M.S. and Ph.D. in microbiology from the University of Illinois at Urbana-Champaign.

Jeff Bronstein, M.D., Ph.D.

Neurology, Adult Neurology, UCLA Medical Center

Los Angeles, California

Jeff Bronstein received his bachelor's degree from the University of California, Berkeley, and M.D. and Ph.D. from UCLA as a recipient of the Medical Scientist Training Program Award. He completed a residency in Neurology and fellowship training in Movement Disorders at UCLA and at Queens Square in London. Dr. Bronstein also completed a postdoctoral fellowship in molecular biology before being appointed an Assistant Professor of Neurology in 1994, Director of the Movement Disorders Program at UCLA in 1996, Professor of Neurology in 2006, and Professor of Molecular Toxicology in 2007. His clinical interests include the management of Parkinson's disease (PD) and other movement disorders, surgical treatment of PD, and developing new therapies for patients. Dr. Bronstein's research interests include the study of the causes of PD (environmental and genetic) using cell and zebrafish models as well as population-based studies. His research is supported by the NIH, Veterans Administration, and private foundations. Dr. Bronstein is the Principal Investigator of one of six National Parkinson's Disease Centers (PADRECC) at the Veterans Administration Medical Center.

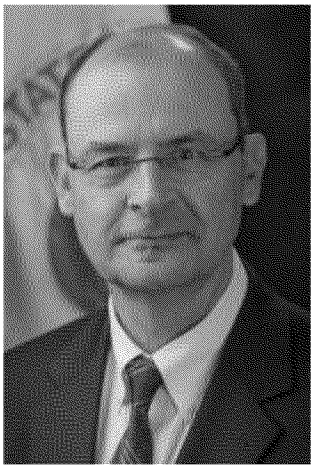


John Bucher, Ph.D.

Associate Director, NTP; Director, Division of the NTP/NIEHS/NIH

Research Triangle Park, North Carolina

John Bucher holds a Ph.D. in Pharmacology from the University of Iowa; an M.S. in Biochemistry from the University of North Carolina; and a B.A. in Biology from Knox College. He was an NIH Postdoctoral Fellow in Biochemistry and Environmental Toxicology at Michigan State, and he is a Diplomate of the American Board of Toxicology and Fellow of the Collegium Ramazzini. Research interests include characterization of the toxic and carcinogenic potential of a variety of chemicals, mixtures and physical agents studied by the National Toxicology Program (NTP), and issues related to the improvement of research assays and literature analysis tools for these purposes. Recent efforts include development of initiatives examining the genetic and epigenetic bases for variations in response to environmental agents, and implementation of new high throughput screening tools for toxicological testing as outlined in the NTP Vision and Roadmap for the Future, and the NRC report on Toxicology in the 21st Century.



Thomas Burke, Ph.D.

Deputy Assistant Administrator, EPA Office of Research and Development, EPA Science Advisor

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Thomas Burke, Ph.D. is the Deputy Assistant Administrator of Environmental Protection Agency's (EPA) Office of Research and Development (ORD) as well as EPA's Science Advisor. Dr. Burke served as the Jacob I. and Irene B. Fabrikant Professor and Chair in Health, Risk and Society and the Associate Dean for Public Health Practice and Training at the Johns Hopkins Bloomberg School of Public Health before coming to EPA. He was also a Professor in the Department of Health Policy and Management, with joint appointments in the Department of Environmental Health Sciences and the School of Medicine Department of Oncology. Additionally, he was the founder of and served as the Director of the Johns Hopkins Risk Sciences and Public Policy Institute. His research includes the development of new approaches to environmental health risk assessment and environmental health surveillance, and their applications to environmental health policy. Before his time at Johns Hopkins, Dr. Burke was Deputy Commissioner of Health for the State of New Jersey and Director of the Office of Science and Research in the New Jersey Department of Environmental Protection. In New Jersey, he directed initiatives that influenced the development of national programs, such as Superfund, the Safe Drinking Water Act, and the Toxics Release Inventory. Dr. Burke also served on EPA's Science Advisory Board, as well as advisory boards for the Centers for Disease Control and Prevention, and on various committees for the National Academy of Sciences (NAS). Dr. Burke chaired the NAS committee that wrote the "Science and Decisions: Advancing Risk Assessment" report. The report, commonly known as the Silver Book, examines some of the greatest challenges to the country's assessment, management and communication of environmental risks. He received his Ph.D. in epidemiology from the University of Pennsylvania, his M.P.H. from the University of Texas, and his B.S. from Saint Peter's College. Tom is originally from Jersey City, NJ.

Elaine M. Faustman, Ph.D., D.A.B.T., A.T.S.

Professor, Environmental and Occupational Health Sciences, University of Washington

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Dr. Elaine M. Faustman received her A.B. in Chemistry and Zoology from Hope College (1976) and her doctorate in Pharmacology/Toxicology from Michigan State University (1980). She took her postdoctoral training in Toxicology and Environmental Pathology in the School of Medicine at the

University of Washington. She is currently Professor and Director, Institute for Risk Analysis and Risk Communication in the School of Public Health and Community Medicine at the University of Washington. Her research interests include quantitative risk assessment for non-cancer endpoints, molecular mechanisms of developmental and reproductive toxicity, and in vitro and molecular biological methodologies. She is a principal investigator of an EPA-NIEHS-funded Child Health Center, which is evaluating key mechanisms defining children's susceptibility to pesticides, and a former PI of a regional National Children's Center. She is an elected fellow of the American Association for the Advancement of Science and the Society of Risk Analysis. She is serving on the USEPA Science Advisory Board. She has served as chair for the National Academy of Sciences Committee on Developmental Toxicology and as a member for the NIEHS-NTP Committee on Alternative Toxicology Methods. Previously, she has served on the NIEHS-NTP Board of Scientific Counselors, National Academy of Sciences Committee in Toxicology, Institute of Medicine and Upper Reference Levels of Nutrient Subcommittee of the Food and Nutrition Board. She has served on the executive boards of the Society of Toxicology, the Teratology Society and NIEHS Council. She has served as Associate Editor of Fundamental and Applied Toxicology and on the editorial boards of Birth Defects Research Journal, Reproductive Toxicology and Toxicology Methods. She is the Secretary General for the International Union of Toxicology (IUTOX). Current research in her laboratory has focused on the development of methods to facilitate refinement and reduction of animal use. In vitro models developed include a new model for mouse embryonic neuronal precursor cells and 3 dimensional co-cultures of sertoli and germ cells. Biologically based models for normal and perturbed neurodevelopment have been published which allow for evaluation of specific molecular mechanisms.

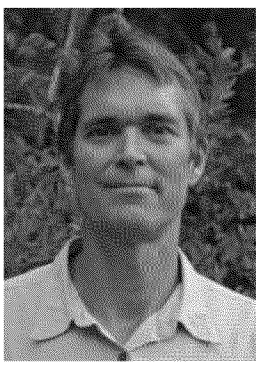
Irva Hertz-Picciotto, Ph.D., M.P.H.

Professor and Chief, Division of Environmental and Occupation Health, Department of Public Health Sciences, School of Medicine and the UC Davis MIND Institute; Director, Northern California Collaborative Center for the National Children's Study; Deputy Director, UC Davis Children's Center for Environmental Health; Principal Investigator, The CHARGE Study and The MARBLES Study

Sacramento, California

Dr. Hertz-Picciotto is an internationally renowned environmental epidemiologist with over 200 publications on environmental exposures such as metals, pesticides, air pollutants and endocrine disruptors, their interactions with nutrition, and their influences on pregnancy, the newborn, and child development. In 2002, she turned her attention to autism, launching the CHARGE Study, the first large, comprehensive population-based study of environmental factors contributing to autism, and a few years later, MARBLES (Markers of Autism Risk in Babies – Learning Early Signs),

to search for early environmental and biologic predictors of autism, starting in pregnancy. She also collaborates on the multi-site EARLI study, and is Director of the Northern California Center for the National Children's Study. Dr. Hertz-Picciotto sits on editorial boards for four major scientific journals in epidemiology, environmental health, and autism, including as Associate Editor of Environment International and has held appointments on state, national and international advisory panels to organizations such as the Food Safety in Europe Working Group, U.S. Environmental Protection Agency, National Toxicology Program, California Air Resources Board, and NIH Interagency Coordinating Committee on Autism Research. She has been elected President of two of the largest professional epidemiology societies; chaired the Expert Panel on CDC's Vaccine Safety Database for Studies of Autism and Thimerosal; chaired National Academy of Sciences Panels on Agent Orange and Vietnam Veterans and more recently the Institute of Medicine Committee on Breast Cancer and the Environment. Dr. Hertz-Picciotto has taught epidemiologic methods on four continents and mentored 60 doctoral and postdoctoral scholars. In 2011, she received the Goldsmith Lifetime Achievement Award by the International Society for Environmental Epidemiology.



Keith Houck, Ph.D.

EPA National Center for Computational Toxicology (NCCT)

Research Triangle Park, North Carolina

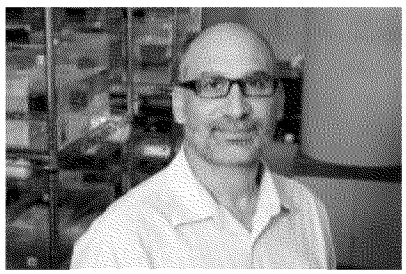
Dr. Keith Houck is with the EPA's National Center for Computational Toxicology. He leads efforts within the EPA's Chemical Safety for Sustainability Program, researching new, more efficient, ways to address managing the safety of chemicals, particularly in assessing chemicals for potential risk to human health and the environment. Prior to joining the EPA, Dr. Houck worked in the biotechnology and pharmaceutical fields where he applied molecular and cellular biology skills towards identification of drug candidates for Sphinx Pharmaceuticals and Eli Lilly & Co. Earlier, he completed a postdoctoral fellowship at Genentech, Inc., in the molecular biology department following receiving his Ph.D. in Pathology and Toxicology from Duke University in 1989. Dr. Houck received an M.S. in Chemistry from the University of North Carolina at Chapel Hill and B.S. in Biology from Guilford College.

Valerie Hu, Ph.D.

Professor, Biochemistry and Molecular Biology and Associate Professor of Genetics, The George Washington University

Washington, District of Columbia

Valerie W. Hu, Ph.D., is a Professor of Biochemistry and Molecular Medicine at The George Washington University School of Medicine and Health Sciences in Washington, DC. Dr. Hu was trained as a chemist, with a Ph.D. in Chemistry from the California Institute of Technology and a B.S. in Chemistry from the University of Hawaii, and did postdoctoral research at UCLA in the fields of membrane biochemistry and cellular immunology. As an independent academic researcher and professor, she has had a long history in cross-disciplinary studies focused on protein structure-function relationships and membrane-protein interactions. More recently, as the mother of a son on the autism spectrum, she redirected her research focus towards autism. Dr. Hu has since become a leader in the application of multi-disciplinary, integrative genomics approaches to studying autism spectrum disorders (ASD), which includes the integration of large-scale whole genome data from gene expression, genetic, and epigenetic analyses. The long-term goals of her research are diagnosis and personalized treatment of ASD that is based on in-depth understanding of the underlying pathobiology giving rise to different manifestations of autism. This pathobiology will be revealed in part through the identification of altered genes, dysfunctional pathways, and aberrant gene regulatory mechanisms specific to the different subtypes of ASD, coupled with the identification of environmental risk factors for ASD.



Seth Kullman, Ph.D.

Associate Professor, North Carolina State University

Raleigh, North Carolina

Dr. Kullman received a B.S. in Molecular and Cellular Biology from Sonoma State University (1987) and a Ph.D. in Pharmacology and Toxicology from the University of California at Davis (1996). During his postdoctoral training at UC Davis (1996-2000) he served as assistant director of UC Davis Ecotoxicology program. Dr. Kullman joined the faculty of the Integrated Toxicology Program at Duke University (2000) and served as director of the Duke University Superfund Center Functional Genomics Core (2004-2007). He joined the faculty of North Carolina State University in 2007 and is currently Professor of Toxicology within the Department of Biological Sciences. Dr. Kullman has a long-standing history of employing small aquarium fish models to investigate neural and endocrine pathways that govern critical steps of embryonic development. Dr. Kullman has over 60 peer-reviewed publications and book chapters. He has

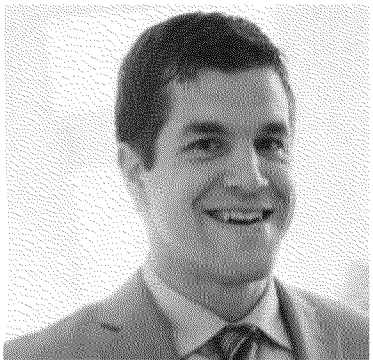
been a visiting scholar at the Mount Desert Island Biological Laboratory. He has participated in proposal review panels for the National Science Foundation, National Oceanic and Atmospheric Administration, Environmental Protection Agency and the National Institutes of Health. He has participated as an ad hoc member for scientific review with the Environmental Protection Agency, FIFRA-Scientific Advisory Panel Endocrine Disruptor Screening Committee, Water Environment Research Foundation, and Water Research Foundation and is a full member of the Society of Toxicology, Society for Environmental Toxicology and Chemistry, and Endocrine Society.

Pamela Lein, M.S., Ph.D.

Professor, Department of Molecular Biosciences, School of Veterinary Medicine; Chair, UC Davis Pharmacology and Toxicology Graduate Group

Davis, California

Pamela Lein earned a B.S. in Biology from Cornell University, a M.S. in Environmental Health Science from East Tennessee State University and a Ph.D. in Pharmacology and Toxicology from SUNY at Buffalo School of Medicine. Prior to joining the faculty at UC Davis, Dr. Lein held faculty positions in the Center for Research on Occupational and Environmental Toxicology at Oregon Health & Science University, the Department of Environmental Health Sciences at the Bloomberg School of Public Health at the Johns Hopkins University, and the Department of Biology at Canisius College in Buffalo, NY. Currently, Dr. Lein is Professor and Vice-Chair of the Department of Molecular Biosciences in the School of Veterinary Medicine at the University of California, Davis as well as a faculty member of the UC Davis MIND Institute and Center for Children's Environmental Health. She serves as Chair of the Graduate Group in Pharmacology and Toxicology, Director of a training grant in Environmental Health Sciences Training funded by the NIEHS and Director of the NINDS-funded UC Davis CounterACT Center of Excellence. Dr. Lein is standing member of an NIH study section and is on the editorial board of several toxicology and environmental health focused journals. She teaches neuropharmacology and neurotoxicology in the DVM and graduate curricula. Her research focuses on understanding the molecular and cellular mechanisms by which environmental chemicals, immune mediators and drugs influence the development and function of the central and peripheral nervous systems, and how these peripheral influences interact with genetic risk factors to determine individual risk for neurodevelopmental and neurodegenerative disorders.

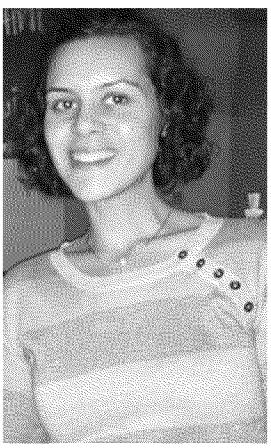


Matt Martin, Ph.D.

Research Biologist at US EPA National Center for Computational Toxicology

Research Triangle Park, North Carolina

Matt Martin is a research biologist within NCCT. He earned both his M.S. (Environmental Science and Engineering) and Ph.D. (Environmental Science with an additional focus on Bioinformatics and Computational Biology) from the University of North Carolina at Chapel Hill. He earned his B.S. (Integrated Science and Technology) from James Madison University. His doctorate work focused on developing predictive models of reproductive toxicity and the application of those models toward chemical prioritization and integrated testing strategies. Matt started his career at Versar Inc. as an environmental scientist working at EPA doing antimicrobial pesticide risk assessment and eventually to CH2M Hill Inc. as a database analyst. Matt began his career at EPA as part of the EPA Intern Program (now called the Environmental Careers Program) where he was able to do rotations across different parts of the agency, including the Office of Pesticide Programs and Office of Pollution Prevention and Toxics. He is now a biologist within NCCT, where he is part of the EPA ToxCast team and leads the Toxicity Reference Database (ToxRefDB) effort. Matt also serves as the CSS take led for developing predictive models of toxicology using high throughput screening data.



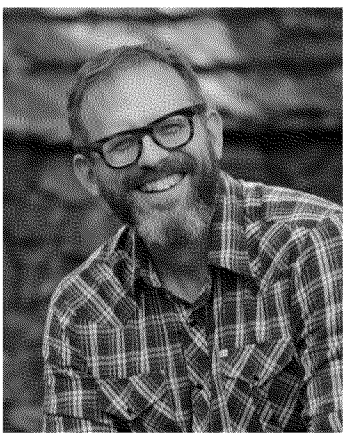
Jennifer McPartland, Ph.D.

Senior Scientist, Environmental Defense Fund

Washington, D.C.

As a senior scientist in the health program at Environmental Defense Fund, Dr. Jennifer McPartland focuses on advancing science, policy, and market solutions to protect human health and the environment from harmful chemical exposures. Dr. McPartland leads EDF's engagement in federal efforts to advance new chemical testing approaches and apply systematic review methodologies in chemical assessments. Jennifer also serves as the technical advisor for EDF's corporate partnerships related to chemicals in the marketplace and in this capacity has worked with businesses to develop corporate chemical policies and management frameworks. She also leads EDF's work in chemical alternatives assessment and supports EDF's legislative and regulatory work related to the Toxics Substances Control Act. Jennifer currently serves as a member of the U.S. EPA's Board of Scientific Counselors Chemical Safety for Sustainability Subcommittee and of the GreenScreen for Safer Chemicals steering committee.

Before her arrival at EDF, Jennifer was the 2009-2010 American Society for Microbiology/American Association for the Advancement of Science Congressional Fellow working in the office of Congresswoman Diana DeGette. Prior to entering the policy realm, Dr. McPartland earned her Ph.D., and was a postdoctoral researcher, at the University of Chicago where she pursued research in the field of molecular biology using bacteriophage as a model organism to study protein functions and interactions. Jennifer received a B.S. in chemistry with a specialization in biochemistry from the University of Virginia, where she conducted cancer research in both academic and private research labs.

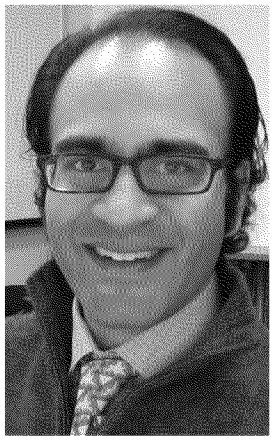


Craig Newschaffer, Ph.D.

Professor, Director of the A.J. Drexel Autism Institute

Philadelphia, Pennsylvania

Craig Newschaffer is founding director of the A.J. Drexel Autism Institute at Drexel University and a Professor in the Department of Epidemiology and Biostatistics at the Drexel University School of Public Health. The A.J. Drexel Autism Institute applies a public health science approach to address challenges facing individuals with ASD and their families. Dr. Newschaffer is an epidemiologist whose main research focus is the discovery of modifiable autism risk factors. He has directed an NIH Autism Center of Excellence (ACE) project, been a site PI on other major autism epidemiology initiatives, including both the ADDM Network and SEED Study, and led an an NIH-funded project testing streamlined approaches to ASD case confirmation for epidemiologic research purposes. He has served on the DOD Autism Research Program Integration Panel, the Autism Speaks Science Advisory Board, and, on multiple occasions, the IACC Strategic Plan for Autism Research expert review group. Dr. Newschaffer is a fellow of the American College of Epidemiology, the Vice President of the International Society for Autism Research, and an Associate Editor of *Autism Research*. He is also a former Associate Editor of the *American Journal of Epidemiology* and currently sits on the editorial board of the *Journal of Neurodevelopmental Disorders*.



Chirag Patel, Ph.D.

Research Associate in Biomedical Informatics, Harvard Medical School

Boston, Massachusetts

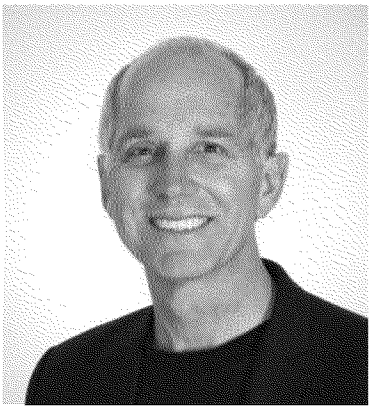
The long-term research goal of Chirag Patel's Group is to solve problems in human health and disease by developing bioinformatics approaches to reason over large-scale environmental exposure and genomic information spanning molecules to populations. He has a group, called "Chirag Patel's Group". They attempt to dissect the relationship between the genome and exposome in human health using tools of translational bioinformatics in large data streams such as electronic health records and epidemiological cohorts, integrating personal exposure monitoring and genome sequence information to attain a comprehensive picture of who we are.

Heather Patisaul, Ph.D.

Department of Biology, North Carolina State University

Raleigh, North Carolina

Dr. Heather Patisaul is an Associate Professor of Biological Sciences at NC State University. Dr. Patisaul received her Ph.D. from Emory University in 2001 and explores the mechanisms by which endocrine disrupting chemicals (EDCs) alter neuroendocrine pathways in the brain related to sex specific physiology and behavior. Dr. Patisaul is a NIEHS ONES Award recipient and a principal investigator in the CLARITY-BPA program, which is a consortium based approach to assessing the health effects of BPA led by NIEHS in collaboration with the NTP, NCTR and the FDA. She has participated on several national and international expert panels and workshops related to health effects associated with endocrine disruptors including the 2010 World Health Organization Expert Panel on the health risks of Bisphenol A, and the 2012 Workshop on Low Dose Effects of Endocrine Active Chemicals co-organized by the US National Institute for Environmental Health Sciences/NIH and the Joint Research Centre's Institute for Health and Consumer Protection. She is specifically interested in how EDCs impact the neural pathways that coordinate the physical and behavioral changes that occur during the pubertal transition. EDCs of interest include Bisphenol A (found in plastics and epoxy resins) phytoestrogens (found in soy foods), and the fire retardant mixture Firemaster 550. Her lab uses a variety of traditional and transgenic rodent models (rats, mice and voles) and employs a suite of neuroanatomical, neurobehavioral, and molecular testing strategies such as RNAseq, qtPCR, in situ hybridization, autoradiography and immunohistochemistry.

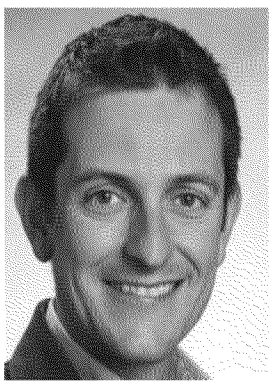


Chris Portier, Ph.D.

Senior Contributing Scientist, Environmental Defense Fund

Washington, D.C.

Dr. Christopher J. Portier is a senior contributing scientist with Environmental Defense Fund. He is an expert in the design, analysis, and interpretation of environmental health data with a focus on carcinogenicity. He has contributed to the development of cancer risk assessment guidelines for national and international governments and has directed or contributed significantly to numerous scientific reviews and risk assessments. He will advise EDF on this project. Formerly, Dr. Portier was the Director of the National Center for Environmental Health and the Director of the Agency for Toxic Substances and Disease Registry at the Centers for Disease Control and Prevention, and Associate Director of the National Institute of Environmental Health Sciences Research on Cancer. Dr. Portier is currently a Senior Visiting Scientist at the International Agency for Research on Cancer, and an Adjunct Professor at Emory University, Maastricht University and the University of Queensland.



Francisco Quintana, Ph.D.

Associate Professor of Neurology, Brigham and Women's Hospital, Harvard Medical School

Boston, Massachusetts

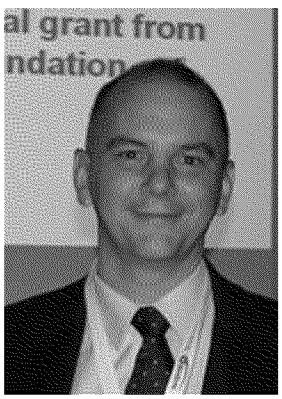
The Quintana lab is focused on the characterization of signaling pathways that control the activity of the immune system, with the ultimate goal of identifying novel therapeutic targets and biomarkers for immune-mediated disorders. To this aim, we use genomic and proteomic tools to the study zebrafish, murine and human disease models of inflammation.

Robert Ring, Ph.D.

Chief Science Officer, Autism Speaks

Princeton, New Jersey

Rob Ring was named Chief Science Officer in June of 2013. Upon his appointment Rob said his first goal would be to "put science to work for our families," and that makes perfect sense given his background. Rob first joined Autism Speaks in June of 2011 as Vice President of Translational Research. In that role, Rob was responsible for the development and implementation of the foundation's expanding translational research portfolio, which serves to accelerate the process of converting scientific breakthroughs and innovations in technology into actual products that address the wide range of unmet needs of the autism community, from healthcare to education to daily living. Rob also serves as President of Delivering Scientific Innovation for Autism (DELSIA), the venture philanthropy arm of Autism Speaks that is helping to facilitate translational activities in the for-profit sector required to develop commercial products that will improve the quality of life and health for individuals with autism. Prior to joining Autism Speaks, Rob served as Senior Director and Head of the Autism Research Unit at Pfizer Worldwide Research and Development in Groton, Conn. There he led the first dedicated research group in the pharmaceutical industry focused specifically on the discovery and development of medicines for neurodevelopmental disorders, specifically ASD. Prior to Pfizer, Rob worked for over 10 years in psychiatric medicines discovery and development at Wyeth Research in Princeton, N.J. Rob earned a B.A. double major in both Fine Art and Biology from Westmont College in Santa Barbara, Calif., and a Ph.D. in Molecular Neurobiology from City of Hope in Southern California. He holds adjunct faculty appointments in the Departments of Psychiatry at Mount Sinai School of Medicine (N.Y.) and Pharmacology and Physiology at Drexel University College of Medicine (Philadelphia).



Peter Schmidt, Ph.D.

Chief Information Officer, Vice President, Research Programs, National Parkinson Foundation

Miami, Florida

Dr. Schmidt joined NPF as Chief Information Officer and Vice President, Research and Professional Programs in June 2009 where he is responsible for the Parkinson's Outcomes Project, a longitudinal study of Parkinson's disease to identify best practices in care to achieve optimal patient-reported and clinically measured outcomes. With over 17,500 clinical evaluations of over 7,500 patients, the Parkinson's Outcomes Project is the largest clinical study of Parkinson's disease ever conducted and includes the largest set of patient-reported outcome

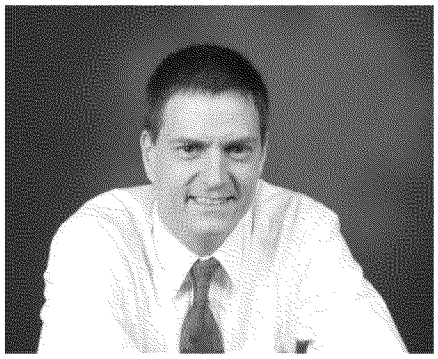
measures ever collected in a prospective study. Prior to NPF, Schmidt was an investment banker in Norwalk, CT., president of a software company supporting chronic disease management, and COO of an on-line education joint venture of Oxford, Stanford, and Yale universities. He is an active member of several trade groups and is widely published in both scientific and trade journals on issues around medicine, health information technology and finance. Dr. Schmidt earned his bachelor's degree at Harvard University and was awarded an M.S. and Ph.D. from Cornell University, Sibley School of Mechanical Engineering where he studied gait and balance and total joint replacement. He completed a fellowship at the Hospital for Special Surgery in New York.

Gina Solomon, M.D., M.P.H.

Deputy Secretary for Science and Health, CalEPA

San Francisco, California

Gina Solomon, M.D., M.P.H., was appointed by Governor Edmund G. Brown Jr. in April 2012 to serve as Deputy Secretary for Science and Health at the California Environmental Protection Agency. Prior to joining CalEPA, Gina was a senior scientist at the Natural Resources Defense Council since 1996 and has been on the faculty in the Division of Occupational and Environmental Medicine at the University of California, San Francisco (UCSF) since 1997, where she still holds the title of clinical professor of health sciences. Gina served as the director of the Occupational and Environmental Medicine Residency Program at UCSF from 2008-2012 and was the associate director of the UCSF Pediatric Environmental Health Specialty Unit from 2003-2009. Gina has served on numerous scientific committees for the State of California, the U.S. Environmental Protection Agency, the National Toxicology Program, and the National Academy of Sciences. She is on the editorial board of the journal Environmental Health Perspectives, published by the National Institute of Environmental Health Sciences, and serves regularly as a peer-reviewer for numerous scientific journals. She has authored about 50 peer-reviewed articles, a book published by the Massachusetts Institute of Technology Press, numerous reports, and chapters in several medical textbooks. Gina's prior work has included research on diesel exhaust and asthma, endocrine disrupting chemicals, pesticides, environmental contaminants in New Orleans after Hurricane Katrina, the health implications of the 2010 Gulf oil spill, and the health effects of climate change. Gina received her bachelor's degree from Brown University, a Doctorate of Medicine from the Yale University School of Medicine, and a master's degree in public health from the Harvard School of Public Health. She is board-certified in both internal medicine and occupational and environmental medicine, and is licensed to practice medicine in California.

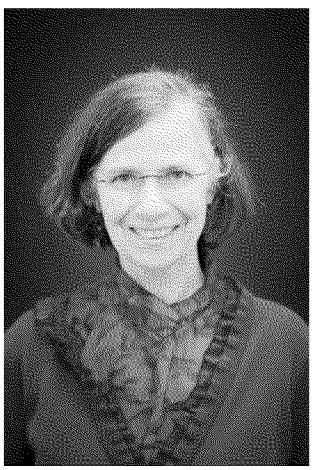


Robert Tanguay, Ph.D.

Distinguished Professor, Director of the NEIHS Toxicology Training Grant, Sinnhuber Aquatic Research Laboratory, Oregon State University

Corvallis, Oregon

Robert Tanguay is a Distinguished Professor in the Department of Environmental and Molecular Toxicology, the Director of the Oregon State University Superfund Research Program, Director of the Sinnhuber Aquatic Research Laboratory, and the Director of a NIH training grant. He received his B.A. in Biology from California State University-San Bernardino, his Ph.D. in Biochemistry from the University of California-Riverside and postdoctoral training in Developmental Toxicology from the University of Wisconsin-Madison. His first Academic appointment was as an Assistant Professor in the School of Pharmacy at the University of Colorado Health Sciences Center. He was recruited to OSU in 2003 as an Associate Professor. He serves on a number of academic, commercial and federal advisory boards and is on the editorial board for several scientific journals. Over the past several years he has pioneered the use of zebrafish as a toxicology model and recently developed automated high throughput instrumentation to accelerate phenotype discovery in zebrafish. A major focus is on identifying chemicals and mixtures that produce neurotoxicity. Phenotypic anchoring coupled with the inherent molecular and genetic advantages of zebrafish is used to define the mechanisms by which chemicals, drugs and nanoparticles interact with and adversely affect vertebrate development and function. These tools are now routinely used to assist in the development of inherently safer chemicals and nanoparticles.



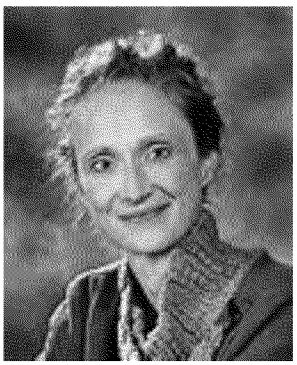
Caroline Tanner, M.D., Ph.D., F.A.A.N.

Director, Parkinson's Disease Research, Education and Clinical Center, San Francisco Veterans Affairs Health Care System, Professor in Residence, Dept. of Neurology, University of California San Francisco

Sunnyvale, California

Dr. Tanner's clinical practice specializes in movement disorders. Her research interests include investigations of the descriptive epidemiology, environmental and genetic determinants, biomarkers, early detection, nonmotor disease features and interventions for the secondary prevention, disease modification and symptomatic treatment of movement disorders and neurodegenerative diseases. Dr. Tanner and her colleagues have identified associations between toxicant exposures including certain pesticides, solvents and

persistent environmental pollutants and increased risk of Parkinson's disease, and a greater risk in individuals with certain genetic variants (gene-environment interaction). Dr. Tanner is past co-chair of the Parkinson Study Group (PSG) and has conducted numerous clinical trials with the PSG and other groups. Other research interests include work to facilitate collaborative research and improve patient access to research and clinical care, locally and internationally, including telemedicine and patient reported outcomes as well as work to identify PD-associated biomarkers (Parkinson's Progression Markers Initiative, LABS-PD studies). Dr. Tanner chairs the MDS Epidemiology Task Force, serves on the Scientific Advisory Boards of the Michael J. Fox Foundation and the National Spasmodic Dysphonia Association, and on committees for NIH and the American Academy of Neurology (AAN). Her honors include the AAN Movement Disorders Research Award in 2012, the Cotzias Award of the Spanish Neurological Society in 2013 and the White House Champions of Change for Parkinson's in 2015.

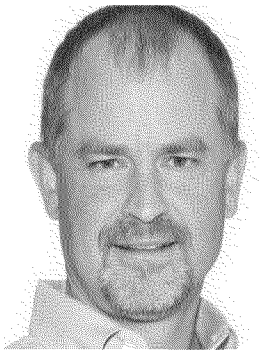


Kristina Thayer, Ph.D.

Director, Office of Health Assessment and Translation, NIEHS, Deputy Director of Analysis, NTP

Research Triangle Park, North Carolina

Kristina Thayer, Ph.D. is director of the National Toxicology Program's (NTP) Office of Health Assessment and Translation (OHAT) located on the campus of the National Institute for Environmental Health Sciences (NIEHS). OHAT conducts evaluations to assess the evidence that environmental chemicals, physical substances, or mixtures (collectively referred to as "substances") cause adverse health effects and provides opinions on whether these substances may be of concern given what is known about current human exposure levels. OHAT also organizes workshops, state-of-the-science evaluations, or other analysis activities to address issues of importance in environmental health sciences. Before becoming director of OHAT, she held positions in the NTP Office of Liaison, Policy, and Review, the NIEHS Office of Risk Assessment Research and the NTP Center for the Evaluation of Risks to Human Reproduction (CERHR). Prior to joining the NTP/NIEHS, she was a senior scientist at the World Wildlife Fund and then at the Environmental Working Group.

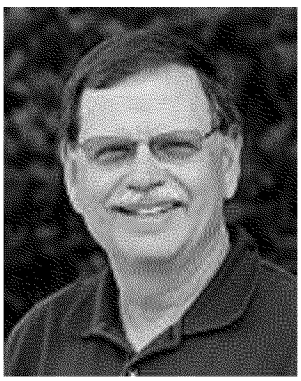


Rusty Thomas, Ph.D.

Director National Center for Computational Toxicology at USEPA

Research Triangle Park, North Carolina

Russell Thomas is the director of the National Center for Computational Toxicology at the U.S. Environmental Protection Agency. The Center is researching new, more efficient, ways to evaluate the safety of chemicals, particularly in assessing chemicals for human health effects. Prior to coming to the U.S. EPA, Dr. Thomas was the director of the Institute for Chemical Safety Sciences at The Hamner Institutes for Health Sciences and worked in the biotech and biopharmaceutical industry. Dr. Thomas' academic training includes a B.A. in chemistry from Tabor College, an M.S. in radiation ecology and health physics from Colorado State University, and a Ph.D. in toxicology also at Colorado State. Following his doctoral studies, Dr. Thomas performed postdoctoral research in molecular biology and genomics at the McArdle Cancer Research Laboratory at the University of Wisconsin. Dr. Thomas also maintains an adjunct faculty appointment in the Division of Pharmacogenomics and Individualized Therapy at the University of North Carolina at Chapel Hill.



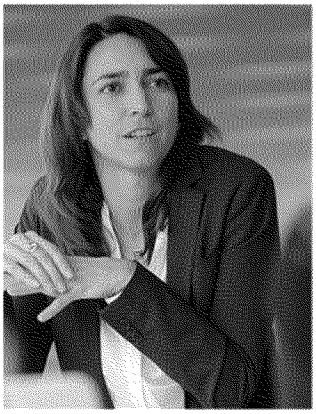
Ray Tice, Ph.D.

Senior Advisor (Retired), Biomolecular Screening Branch, NTP

Durham, North Carolina

Dr. Tice received a Ph.D. in Biology in 1976 from Johns Hopkins University (Baltimore, MD). From 1976-1988, he was employed by the Medical Department at Brookhaven National Laboratory (Upton, NY) and from 1988 to 2005 by ILS, Inc. (Durham, NC). In 2005, he joined NIEHS as the Deputy Director of the NTP Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) and in 2009 became Chief of the Biomolecular Screening Branch (BSB) within the Division of the NTP. In this position, he was responsible for directing NTP's high throughput screening program and supporting the U.S. Tox21 effort. Dr. Tice retired in January 2015 and is currently serving as a special volunteer to the BSB and DNTP. He served as President of the U.S. Environmental Mutagen Society and as Vice-President of the International Association of Environmental Mutagen Societies. In 2008, he shared the North American Alternative Award from the Humane Society of the United States and Proctor & Gamble for "outstanding scientific contributions to the advancement of viable alternatives to animal testing". In 2009, Dr. Tice received the EMS Alexander Hollaender Award in recognition of outstanding contributions in the application of the principles and techniques of environmental mutagenesis to the protection of human health. Among NIH awards, in 2014, he received NIH

Director's Awards as a member of the NIEHS/NCATS/UNC DREAM Toxicogenetics Challenge Team and of the Tox21 Team. He has authored 170 scientific papers and book chapters and edited 4 symposia proceedings.



Sarah Vogel, M.P.H., Ph.D.

Vice-President, Health, Environmental Defense Fund

Washington, D.C.

Sarah Vogel is Vice President of EDF's Health program and author of the book *Is It Safe: Bisphenol A and the Struggle to Define the Risks of Chemicals*. She holds a Ph.D. from Columbia University's Mailman School of Public Health and a M.P.H. from Yale University. Sarah's team worked with Walmart to establish an industry leading policy on chemicals in household and personal care products. Prior to joining EDF, she worked as a program officer at the Johnson Family Foundation and co-chaired the Health and Environmental Funders Network, a national alliance of foundations working on environmental health issues.